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VARIATIONS IN THE EARTH'S MAGNETIC FIELD

OBSERVATIONS made in a tent on the lake shore in Mackinac County, Mich., during the last month have fully verified the results and conclusions published in my paper entitled "Local Magnetic Storms."

Cloud shadows diminish the permeability of the space within them in precisely the same way that the earth's shadow does at night. The molecules of air are ionized by solar radiation. They are then little magnets, which tend to set along the lines of force of the earth's field, in such a way as to add their magnetic effect to that of the earth's field. When solar radiation is cut off, the air molecules begin to return to their normal condition. Wind gusts and falling rain drops assist in this operation. They decrease the permeability.

When an iron bar is placed within a coil of wire carrying a current, its molecules are not quite so free to set in positions such that their magnetic effect is added to that of the coil. A blow from a wooden mallet then assists them. Its effect is directly the opposite of that produced by a gust of wind in air.

These results appear to furnish a rational explanation of the conditions which bring about local, daily and annual variations in the earth's magnetic field. Local variations are due to local variations in the weather. Clouds and sunshine, wind storms and rain, are the agents which bring about a continual swaying of the lines of force.

They also indicate an explanation of what causes the difference in permeability of solid matter.

In this work the needle was enclosed in an airtight case, and mounted on a silk fiber about 40 cm. in length. Its motion was damped. It was deflected at right angles to the magnetic meridian by magnets whose axes were at an angle of 45° with the meridian. The resultant field was partly compensated by bar magnets 120 cm. in length. All magnets were sealed within heavy rubber tubing, mounted in U-shaped supports, and enclosed in ice. The supporting table was a frame made of 2×4 inch timber, bolted together with brass bolts, and the legs of the structure were set two feet

into solid clay and gravel soil. The frame was securely braced.

FRANCIS E. NIPHER
HESSEL, MICH.,
July 26, 1913

EXCUSING CLASS ABSENCES IN COLLEGE

THERE is no general uniformity in the matter of handling class absences in college. In some institutions the individual teachers still excuse for all absences in the course for which the teacher is responsible. In an increasing number of institutions the excusing power is centralized in some one office and in a large number of cases some form of the cut system is used. In some cases the student is allowed as many absences a semester from a course as the course recites times per week, that is, three absences from a three-hour course, four from a four-hour course, etc. In general the number of class cuts allowed seems to run as a minimum about 15 a semester—the number of absences allowed a semester in all courses approximating the number of recitation periods per week.

In cases where this minimum is allowed it means that $5\frac{1}{2}$ per cent, approximately, of the class-room periods may be omitted by any or all students without any account being given for the absences.

A system such as this seems almost an invitation to a student to avail himself of the number of cuts allowed and in a large number of cases is so regarded.

In Oberlin College all class absences are reported to the dean of men and the dean of women, respectively. Each student must give an account to the proper officer of *all* absences.

The results during the semester ending in February, 1913, were as follows in the case of the college men: the average number of absences for each freshman was 6.1, for each sophomore 7.9, for each junior 7.5, for each senior 7.3. This includes absences for *all* reasons, sickness, absence on athletic teams, glee clubs, etc., and counts absences from *all* classes, including physical training. The record of no student is included who left college for any reason before the end of the semester.

The total number of men and absences were as follows during the semester just closed: